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# The Acute Effect of Aerobic Exercise on Anxiety Levels

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DeVolder,

Toni S.

1993



# THE ACUTE EFFECT OF AEROBIC EXERCISE ON ANXIETY LEVELS

A Thesis  
Presented to  
the Faculty of the Department of Physical Education  
Western Kentucky University  
Bowling Green, Kentucky

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

by  
Toni S. DeVolder

August, 1993

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THE ACUTE EFFECT OF AEROBIC EXERCISE  
ON ANXIETY LEVELS

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## TABLE OF CONTENTS

I.	ANALYSIS OF THE PROBLEM.....	3-4
	Statement of the Problem.....	5
	Null Hypothesis.....	5
	Significance of the Study.....	6
	Delimitations.....	6-7
	Limitations.....	7-8
	Assumptions.....	8
	Definition of Terms.....	8-10
II.	REVIEW OF RELATED LITERATURE.....	11-12
	Anxiety Theory.....	12-14
	State/trait Anxiety.....	14-17
	Inverted U Theory.....	18
	Fitness Level.....	18-20
	Summary.....	20
III.	METHODOLOGY	
	Subjects.....	21
	Instrumentation.....	22-23
	Attendance.....	24
	Procedure.....	24-26

IV. PRESENTATION AND ANALYSIS OF DATA.....	27
Statement of Statistical	
Hypotheses.....	28-30
Physical Activity	
Characteristics.....	31
V. DISCUSSION, CONCLUSIONS,	
RECOMMENDATIONS.....	32
Discussion.....	32
Conclusion.....	33
Recommendations for Further	
Study.....	33
Appendix A. State-Trait Anxiety Inventory	
Appendix B. Participants Mean Scores	
Appendix C. Procedures for Scoring STAI	
Appendix D. Self-Report Questionnaire	
Appendix E. Informed Consent	
Appendix F. THR Formula	
Appendix G. Video Information	
REFERENCES.....	48-52



## THE ACUTE EFFECT OF AEROBIC EXERCISE ON ANXIETY LEVELS

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August 1993

52 pages

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The present study sought to determine whether or not state anxiety levels were significantly reduced when individuals participated in aerobic dance workouts of 15 minutes and 30 minutes. Undergraduate university students and faculty enrolled in an aerobic dance class were volunteers in this study. As hypothesized, subjects in the aerobic dance classes did reduce anxiety acutely following both their 15minute and 30 minute workout as assessed by the STAI (Y-Form State Anxiety). Thus, results indicate that state anxiety may be reduced through aerobic dance with similiar situations and individuals. In addition, the study also looked at the posttest state anxiety score differences between the 15 minutes and 30 minutes. The results were not significant, indicating neither length of aerobic dance workout session was superior to the other. These results contribute to a currently expanding area of research examining the relationship between anxiety reduction and aerobic dance.

## CHAPTER I

### ANALYSIS OF THE PROBLEM

The benefits of physical activity have been identified long ago by earlier civilization, yet it is only recently that researchers are beginning to understand the complex relationship between physical activity, physical fitness, and mental and physical health.

In recent years more and more studies have appeared in the literature highlighting the importance of exercise in physical health. Many studies support the idea that diseases such as atherosclerosis, coronary heart disease, hypertension, hypercholesterolemia, diabetes, morbid obesity and osteoporosis can be ameliorated, if not prevented, by cardiovascular exercise. (Anthony, 1991, p. 171)



Carkhuff (1971, 1974) advises that physical fitness programs can and will be a definite developmental and therapeutic tool when dealing with the positive effects of physical exercise on psychological aspects of anxiety. In agreement are Hilyer and Mitchell (1979), who state that physical fitness through systematic exercise increases mental functioning and psychological well-being. Although there are documented positive correlations and interactions between exercise and reduction in anxiety, unanswered questions still remain. It is due, in part, to a lack of agreement over the appropriate research methods, tools, and key term definitions. These controversies have brought about mixed results among studies directed toward the benefits of exercise.

Interest in the study of anxiety has increased during the past fifteen years. The effects of anxiety on subjects are individualized and sometimes hard to understand. Anxiety is still very illusive and complex; past research has only begun to grasp it's multi-dimensional nature. At present, relatively few studies have agreed concerning the acute benefits of aerobic exercise on the anxiety level of the individual.

### Statement of the Problem

The primary purpose of this study was to examine the acute effects immediately following vigorous aerobic dance activity at a defined target heart rate on anxiety levels. A secondary purpose was to determine whether there was any difference in posttest state anxiety levels when the duration of vigorous aerobic exercise was 15 or 30 minutes.

### Null Hypothesis

1. There will be no significant mean difference between pretest and posttest state anxiety scores for 15 minutes of aerobic dance.
2. There will be no significant mean difference between pretest and posttest state anxiety scores for 30 minutes of aerobic dance.
3. There will be no significant mean difference between posttest state anxiety test scores following a 15 minute aerobic dance workout and posttest state anxiety test scores following a 30 minute aerobic dance workout.



### Significance of the Study

The significance of this study was to investigate and attempt to provide additional information about the acute affects of aerobic dance on state anxiety. A positive outcome could result in encouraged use of aerobic activity in medical therapeutic practices and preventative measure techniques for many individuals.

### Delimitations

The following delimitations were imposed on this study.

1. The dependent variable, state anxiety, was measured using the State-Trait Anxiety Scale (Spielberger, 1983).
2. The independent variable was participation in aerobic dance at the individuals' defined target heart rate for either 15 or 30 minutes.
3. Selection of the female participants was with the requirement that they were actively involved in an aerobic dance program for not less than six weeks. The subjects participated in the study for one week and were then given two weeks in between testing weeks,

followed by a testing week.

4. All subjects participated in the same video cassette tape (see Appendix G) for the 15 and 30 minutes of aerobic dance. This procedure was to assure that all participants were given an opportunity for the same workout.

5. State anxiety was assessed during March and April, 1993 at Western Kentucky University. This test was administered two days during the first week, Monday and Wednesday for 15 minutes of aerobic dance. The subjects completed a pretest and posttest for each day. The participants then were not tested for two weeks. The same test and procedure was then administered Monday and Wednesday of the fourth week for 30 minutes of aerobic dance.

#### Limitations

The limitations encountered in this study were related to the sample size and selection of the subjects. Due to the necessity of having to use volunteers in the study and the relatively small sample size, there was a possibility the findings would be restricted only to the subjects involved. Also,



fitness levels were self-reported prior to the study and not physically measured. Lastly, all subjects did not have the same number of days between intervals of the 15 minute and 30 minute aerobic workout.

### Assumptions

Assumptions were as follows:

1. The subjects would maintain a normal exercise routine and frequency during the course of the study.
2. The subjects would answer the test questionnaires truthfully and to the best of their capabilities.
3. The subjects would take accurate measures of their heart rates and stay within their defined target heart rate zone for the duration of the testing time.

### Definition of Terms

Terms pertinent to this study were defined as follows:

1. Acute - Having a sudden onset, sharp rise, and short course (Fox et al., 1989).

2. Anxiety - A state of uneasiness and distress about future uncertainties often marked by physiological signs of doubt concerning the reality and nature of the threat, and by self-doubt about one's capacity to cope with it (Webster, 1986).

3. State anxiety - A transitional emotional state or condition of the human organism that is characterized by subjective, consciously perceived feelings of tension and apprehension, and heightened autonomic nervous system activity which may vary in intensity and fluctuate over time (Spielberger, 1970).

4. Trait anxiety - Represents an individual's relatively permanent personality disposition (Bryant, 1973).

5. State-Trait Anxiety Inventory (STAI) - A Likert-scale inventory designed to measure state and trait anxiety. The STAI contains twenty items that assess state anxiety and twenty items that assess trait anxiety. Spielberger et al. (1970) reports a validity of .93 on female subjects using these scales.

6. Target Heart Rate - (THR) A predetermined heart rate to be maintained during exercise. The heart rate reserve method (Karvonen et al., 1957) was utilized.



HRR (heart rate reserve) = [HRmax (maximal heart rate)  
- HRrest (resting heart rate)] X 75% of the difference  
+ HRrest.

7. 15 Minute Aerobic Dance - Fifteen minutes of continuous aerobic dance within the target heart rate which is monitored eight minutes into the segment and at the end.

8. 30 Minute Aerobic Dance - Thirty minutes of continuous aerobic dance within the target heart rate which is monitored every eight minutes into the segment and at the end.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

A statement by Berger and Owen (1988) suggests the need for developing a "stress-reduction taxonomy" that will determine the parameters of exercise likely to result in positive psychological outcomes. It is also possible that exercise can have a positive effect on psychological states we normally would not believe require treatment such as tension, mental fatigue, and a loss of self-confidence (Biddle & Mutrie, 1991). Jogging is a type of exercise associated with a variety of desirable psychological changes such as decreases in anxiety and depression (Morgan, 1979). These positive outcomes could be very helpful in motivating others to develop a routine of regular exercise. Since physical exercise can take many forms and provide many benefits, for the purpose of this study the focus will be on a specific acute effect of aerobic dance and its possible benefits on state anxiety. The primary question in this study was how does a single bout of aerobic dance,



when done at the appropriate intensity of the participant's target heart rate zone, acutely affect the individual's state anxiety level. The effects of a single bout of physical activity revealed mixed findings from a literature review showing inadequacies in past experimental designs (McGowan, Pierce, & Jordan, 1991). Disputing the notion that a lengthy exercise program is exclusively necessary for positive changes in the mood states were Griest, Klein, Eischens, Faris, Gurman, and Morgan (1978, 1979). These researchers feel there are opportunities for immediate results in a single bout of exercise, although this bout of exercise and its acute benefits need to be studied further to prevent inadequacies in the experimental designs that have resulted in controversies.

#### Anxiety Theory

A recent approach in anxiety research has been to redefine anxiety more concisely, especially with the discovery of more of its complexities. In general, anxiety was initially categorized as one of several traits making up an individual's characteristics and

personality. With the help of Taber's Cyclopedic Medical Dictionary (1992) anxiety can be construed to mean the normal reaction to that which is threatening to one's body, lifestyle, values, or even loved ones. The dictionary does state a certain amount of anxiety can stimulate the individual to purposeful action and is very normal. Excessive amounts of anxiety can, however, lead to interference with the efficient functioning of the individual.

Spielberger (1986) can relate to this definition, and his interpretation explains anxiety linked with fear. His belief is that fear supports the flight theory and is an avoidance technique. Correspondingly, anxiety responds to unpleasant arousal and can be produced by a variety of different reasons, including the instigation of fear. Spielberger (1986) emphasizes anxiety as an extensive concept which occurs when fear is existent. However, it does occur for many other reasons. His primary reasons were threats to life and limb, self-esteem, and an individual's assimilative capacity. Included in his list is loss of a love, intense stimulation, helplessness, and frustration. He also stresses there is a positive state of anxiety brought about by pleasant arousal such as feelings of



exhilaration, energy availability, freedom, and expansiveness.

#### State/Trait Anxiety

State anxiety, which is a reflection of an individual's reaction to transitory situations or situational stress (Bryant, 1973), has been utilized relatively effectively in measuring the acute effects of exercise (Morgan, 1979). Trait anxiety is not as often used due to the assumption it is more enduring and immediate levels would not be expected to change over a short period of time. (Biddle & Mutrie, 1991). State anxiety and trait anxiety were found to be two distinctly different variables that can be measured effectively by the State-Trait Anxiety Inventory (STAI) (Spielberger, 1971). In reflection, these differences have resulted in the two anxiety characteristics. Spielberger (1966) has categorized them into an "Anxiety-State" (A-State) and an "Anxiety-Trait" (A-Trait) characteristics. The STAI was developed by Spielberger et al. (1970) to measure state and trait anxiety as these constructs are employed in trait-state

anxiety theory (Spielberger, 1972). The A-state Scale is comprised of 20 statements that reflect the intensity of the individual's immediate feelings of anxiety (ie., "I feel nervous"). The participants indicate how they feel at that particular moment in time by filling in the circle of one of the four choices: "not at all," "somewhat," "moderately so," "very much so."

A research study utilizing Spielberger's State Trait Anxiety Inventory was conducted by Morgan (1979) concerning the effects of acute exercise on anxiety. Initially he measured the effects of mild exercise on state anxiety using both men and women on a 3.6 mph walk for one mile. This type of exercise did not have a significant impact on the state anxiety. He then used a more intense 45-minute physical workout. This intensity resulted in significantly reduced state anxiety levels 20 to 30 minutes following exercise. Study results indicate that acute exercise can decrease anxiety with appropriate exercise intensities.

Felts (1989) study on state anxiety used 24 females performing a randomly assigned bicycle ergometer test. In an attempt to determine a relationship between ratings of perceived exertion and



exercise-induced decrease in state-anxiety, he tested the subjects at workloads maintaining steady state at 30% and 60% heart rate reserve. He further assessed perceived exertion at three-minute intervals from nine minutes to 24 minutes. His post hoc analysis concluded immediate significant results in the 60% heart rate reserve exercise. He also found significant results 50 minutes following the cessation of the exercise in both exercise levels.

Mihevic (1982) reported similiar conclusions regarding anxiety following a single bout of exercise. He concluded that acute exercise has a "tranquillizing effect" which was evident a few minutes after the exercise. Furthermore it resulted in lower levels of state anxiety when compared to the level at the start of the exercise. As mentioned earlier, however, this is one of these particular studies where some questions arise as a result of the study design. Unfortunately, the researcher used subjects with abnormal levels of anxiety and did not specify an intensity level of exercise within the design. These limitations may produce effects detrimental to the study results and need to be noted (Morgan, 1979). Vigorous exercise is the key to reduced anxiety levels, implies Morgan

(1979) as he cites studies which have shown that light exercise has no effect on anxiety levels. Steptoe and Cox (1988), using high intensity exercise found an average increase in the subjects tension/anxiety score while participating in cycling at 100 watts on an ergometer. It was concluded after the study that the exercise intensity was much higher in the study than the ratings indicated. When dealing with anxiety levels, it is imperative to document the appropriate intensity level of participants exercising since the results may be in contrast with other such studies.

One possible method of measuring the exercise intensity would be the subjects exercising heart rate in comparison to their predetermined target heart rate. If they are above or below their target heart rate for the intensity the researchers specified, their exercise intensity can be modified. Other appropriate tests that would help measure intensity levels may be the heart-rate reserve method, the perceived exertion method or blood pressure monitoring (Fox, Bowers & Foss, 1989).



### The Inverted U Theory

The Inverted U Theory (Yerkes and Dodson, 1908) states that there is an optimal state of arousal which can enhance performance; however, by its very nature over-arousal is a very complicated matter to determine. As arousal increases, performance efficiency increases to a certain degree and then may drop. Over-arousal (anxiety) will result in a performance decrement. A study which supports the inverted U hypothesis was done by Sonstoem and Bernardo (1982) using basketball players as subjects. The study defined low, moderate and high levels of state anxiety in relation to the individual's responsiveness to anxiety. They evaluated the performance of each individual basketball player utilizing a formula for points, rebounds, assists, turnovers, steals and fouls. The study revealed the data to be consistent with the inverted-U hypothesis.

### Fitness Level

In an attempt to determine whether exercise alone is responsible for reductions seen in anxiety, other

factors such as fitness levels of the participants, personalities, and even gender or socioeconomic status must be considered. Fitness level is usually described as cardiovascular fitness as measured by maximal oxygen consumption. Previous research has suggested a reduction in anxiety levels is related to an individual's fitness level. A study by Keller et al. (1984) attempted to determine whether fitness levels had a significant impact by using sixty subjects with a variety of fitness level ranges. They were randomly assigned to three different groups comprised of meditation, music appreciation, or aerobic exercise. Stress/anxiety was in the form of timed mental tasks and was monitored by electodermal activity and heart rate. The results were no significant reduction in anxiety levels with the meditation and music appreciation groups, whereas the aerobic exercise group had a significant reduction.

In order to explore the area of highly trained subjects versus untrained subjects, Sinyor et al. (1983) devised a study using untrained subjects with an estimated max  $\text{VO}_2$  of 31 - 34ml/kg/min. and highly trained subjects with an estimated  $\text{VO}_2$  maximum of 66 - 73ml/kg/min with respect to their responses to



anxiety/stress. Immediately following cessation of the anxiety/stress, the untrained subject's heart rate and state anxiety did not return to resting values as quickly as the highly trained subjects. The results also indicated the state anxiety returned to baseline much faster in the trained subjects. The conclusion drawn from Sinyor et al. study indicated there may be a link between the way one person recovers from psychological stress and how that person recovers from physical exercise.

#### Summary

Research has generally supported a linear relationship between a reduction in anxiety and intense vigorous physical exercise. Key variables identified which have been taken into consideration are the amount of anxiety that can be reduced by physical exercise, and the individuals fitness level in relations to anxiety reduction. There appears to be a direct correlation in the elevated anxiety levels and increases in anxiety reduction. Physical exercise has additionally been used as a therapeutic tool in treating clients with high anxiety levels.

## CHAPTER III

### METHODOLOGY

#### Subjects

Subjects were 85 female aerobic dance participants from Western Kentucky University and Western Kentucky University Community College. Seventeen of the individuals in the study were staff/faculty enrolled in an aerobic dance class. All participants served as volunteer subjects for this study. The ages of the participants ranged from 18 years old to 60 years old. The average age was 24.5 yrs. The individuals were taught the 10 second heart rate count method and target heart rate formula at 75%, prior to the study (see Appendix F). The individuals had given prior written consent to be in the study and undergo the evaluation procedures.



### Instrumentation

The state anxiety portion of the STAI (Spielberger, 1970) self-reporting questionnaire was used in this study. Each item of the state anxiety questionnaire was given a weighted score of one to four (1=presence of the lowest anxiety level, 2=presence of the second lowest anxiety level, 3=presence of the second highest anxiety level, 4=presence of the highest anxiety level). Some questions needed to be reversed for scoring purposes, and the weighted scores for the 20-item scale were then summed. The Alpha Coefficient of the state anxiety scores for a normative sample of college students was .93. The test-retest correlations for the state anxiety scale ranges from .16 to .62 as printed in the manual for the STAI (Form Y). The STAI is also one of the best validated and most widely used instruments for the measurement of anxiety, and it allows for separate assessment of state and trait anxiety, claims Spielberger et al. (1986).

An important factor of the experimental protocol was the maintenance of the defined target heart rate (THR). Intensity of training was determined by

counting the heart rate for 10 seconds and multiplying the answer times six. The HRR method developed by Karvonen et al. (1957) is the difference between the resting heart rate and the maximal heart rate. The THR is then determined by multiplying this difference by 75% and adding the resting heart rate (see Appendix F).

A subject was expected to participate in testing a total of four days with a pretest and a posttest for each day. The first week on Monday and Wednesday encompassed a 15 minute workout resulting in four test scores. A two week break from the testing was then given. The fourth week encompassed a 30 minute workout on Monday and Wednesday resulting in four test scores, thereby providing a total of four pretest scores and four posttest scores. For each subject there was a maximum number of eight test scores. When a subject had all four scores (two pretest, two posttest) of the one week workout, the scores of the pretest were averaged as well as the scores for the posttest. When subjects were unable to participate, either due to illness or absence, their scores were not averaged together but used as separate scores.



### Attendance

The subjects in this study were volunteers, and informed consent was obtained from all subjects. If the subjects did not attend the regularly scheduled class on the day of the study, they were not included in that days data collection since no make-ups were allowed. In order to utilize as many scores as possible, a system was devised using average scores of the pretest and posttest scores of the individuals who participated all four days. The subjects who were not present on all four days did not have the pretest scores averaged on the day they missed. The numbers in the sample size were different for each hypothesis due to the varying attendance of the volunteers on the testing days. All individuals took part in this study in the later part of March 1993 through the end of April 1993.

### Procedure

It was explained to the subjects that they were participants in a study, and their responsibility was to fill out the self-evaluation questionnaire to the best of their ability. Emphasis was placed on

answering the statements on the questionnaire about how they felt at that precise moment while in the room. On the informed consent forms a code number was assigned to each individual (see Appendix E). The subjects were unaware of their numbers.

The individuals were given a pencil and questionnaire as they entered the dance room and were asked to fill it out immediately. Upon completion of answering the questions they prepared for the class. The aerobic dance class involved using a video cassette tape so all individuals in the study were able to view and participate in the same workout (see Appendix G). The workout entailed warm-ups, floorwork, the correct duration of aerobic activity, and cooldown of eight to ten minutes. The aerobic activity was partially step-aerobics and partially traditional dance aerobics. Target heart rates were assessed every eight minutes in the aerobic portion of the workout. The individuals were instructed to place their achieved target heart rate on the right side of their questionnaire when completing the post activity state anxiety test. The only other paperwork involved for the subjects was completion of a self-reporting questionnaire on their activity levels, their participation in physical



exercise per week, and the duration they had been an active participant in physical exercise (see Appendix D). In order to establish reliability in self-reporting, randomly chosen individuals were asked on a one-on-one basis about their activity levels. Thirteen of the 15 subjects responded exactly the same as on their written questionnaire.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF DATA

State anxiety levels in female university enrolled aerobic dance participants were examined over four controlled class periods within two separated weeks. Data were collected using 85 subjects in three different aerobic dance classes at aerobic durations of 15 minutes and 30 minutes of activity. All subjects completed the State Trait Anxiety Inventory (Form Y State-Anxiety) at the beginning of each class period and again at the conclusion of their participation in the aerobic dance class (see Appendix A).

To obtain the test scores, the following test questions were the reversed in point value (1,2,5,8,10,11,15,16,19,20); the remaining items kept their 1-4 point value and were then summed. The state anxiety test score range was a minimum of 20 and a maximum of 80 (see Appendix C).



### Statement of Statistical Hypotheses

1. There will be no statistically significant mean difference between pretest and posttest state anxiety scores for 15 minutes of aerobic dance.
2. There will be no statistically significant mean difference between pretest and posttest state anxiety scores for 30 minutes of aerobic dance.
3. There will be no statistically significant difference between posttest state anxiety test scores following a 15 minute aerobic dance workout and posttest state anxiety mean test scores for a 30 minute aerobic dance workout.

#### Hypothesis 1

The mean score of the participants  $N=72$  in the pretest prior to 15 minutes of aerobic activity was 37.53 with a standard deviation of 10.51. The range was a minimum score of 21 and a maximum score of 61. The mean score of the participants on the posttest was 34.91 with a standard deviation of 8.97. The range of these scores was a minimum score of 20 and a maximum score of 61. The pretest to posttest mean difference

was statistically significant and thus the the null hypothesis was rejected.

Variable	Mean	Std Error	T	Prob> [T]
DIFF 15	-2.2106	0.8576	-2.5777	0.0120*

N=72

\*significant at the .10 level

#### Hypothesis 2

The mean score of the participants N=66 in the pretest prior to 30 minutes of aerobic activity was 39.50 with the standard deviation being 10.86. The range was a minimum score of 22 and the maximum score of 72. The mean score of the participants on the posttest was 37.54 with a standard deviation of 9.61. The range of these scores was a minimum score of 20 and a maximum score of 63. The pretest to posttest mean difference was statistically significant and thus the the null hypothesis was rejected.



Variable	Mean	Std Error	T	Prob> [T]
DIFF	-1.5378	0.8.427	-1.8247	0.0726*

N=66

\*Significant at the .10 level

### Hypothesis 3

The mean posttest score following the 15 minutes of aerobic activity was 34.91 with a standard deviation of 8.97; the mean posttest score following the 30 minutes of aerobic activity was 37.54 with a standard deviation of 9.61. The mean posttest difference between the 15 minutes versus the 30 minutes of aerobic activity was not significant; therefore, the null hypothesis was accepted.

Variable	Mean	Std Error	T	Prob> [T]
DIFFX	1.8305	1.1683	1.5668	0.1226

N=59

### Physical Activity Characteristics

Analysis of the baseline data revealed that the subjects were at different levels of self-perceived physical activity characteristics. Sixty-one of the participants filled out a self-report questionnaire answering the following three questions.

1. On a scale of 1 to 10 (1=lowest, 10=highest) rate how physically active you believe yourself to be.
2. How many days per week do you work out on an average.
3. How long have you been physically active.  
(Beginning with class, 6 weeks, 1 year, 2 years, or longer)

The mean result of the first question was 6.44 (scale 1-10), the mean score of the second question was 2.97 days (scale 1-7), and the mean score of the third question was 3.98 (scale of 1-5). These scores indicate the participants consider themselves to be moderately active individuals in physical exercise for a period of 2 years (see Appendix D).



## CHAPTER V

### DISCUSSION, CONCLUSIONS, RECOMMENDATIONS

This study was designed to investigate the effect of acute exercise on the anxiety level of female participants.

#### Discussion

The t-test revealed the 15 minute aerobic dance workout significantly reduced state anxiety levels at the 0.10 level. The 30 minute aerobic dance workout also significantly reduced state anxiety levels at the 0.10 level. Thus, acute aerobic dance within a THR of 75% of maximum heart rate for both 15 and 30 minutes of aerobic dance did reduce state anxiety levels for this test group. When comparing the 15 minute aerobic exercise session with the 30 minute aerobic exercise session, the null hypotheses was not rejected; therefore, neither length of activity session was superior to the other.

### Conclusions

The findings of this study indicate that acute exercise was an effective means of reducing state anxiety, both at the 15 minute and 30 minute intervals. When comparing two lengths of exercise time both were effective in reducing state anxieties; however, one was not superior to the other in state anxiety reduction.

### Recommendations for Further Study

Parallel research may be conducted that would examine whether heart rate response and/or the recovery heart rate will have a significant effect on state anxiety levels. In addition, further research could possibly identify whether different types of aerobic activity reproduce the same type of results as found in this investigation. An important variable to consider is more control in the attendance of the individuals. If the subjects were randomly selected rather than using volunteers the mortality rate would not be as high. The study could be enhanced by using more time frames and intensity levels in order to determine the optimal level for state anxiety reduction.



RESEARCH REPORT

SOUTHWESTERN COLLEGE

1900-1901

APPENDIX A

# SELF-EVALUATION QUESTIONNAIRE

Developed by Charles D. Spielberger

in collaboration with

R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs

STAI Form Y-1

Name \_\_\_\_\_ Date \_\_\_\_\_ S \_\_\_\_\_

Age \_\_\_\_\_ Sex: M \_\_\_\_\_ F \_\_\_\_\_ T \_\_\_\_\_

**DIRECTIONS:** A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel *right now*, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

VERY MUCH SO  
MODERATELY SO  
SOMEWHAT  
NOT AT ALL

- |  |   |   |   |   |
|--|---|---|---|---|
| 1. I feel calm .....                                       | ① | ② | ③ | ④ |
| 2. I feel secure .....                                     | ① | ② | ③ | ④ |
| 3. I am tense .....  | ① | ② | ③ | ④ |
| 4. I feel strained .....                                   | ① | ② | ③ | ④ |
| 5. I feel at ease .....                                    | ① | ② | ③ | ④ |
| 6. I feel upset .....                                      | ① | ② | ③ | ④ |
| 7. I am presently worrying over possible misfortunes ..... | ① | ② | ③ | ④ |
| 8. I feel satisfied .....                                  | ① | ② | ③ | ④ |
| 9. I feel frightened .....                                 | ① | ② | ③ | ④ |
| 10. I feel comfortable .....                               | ① | ② | ③ | ④ |
| 11. I feel self-confident .....                            | ① | ② | ③ | ④ |
| 12. I feel nervous .....                                   | ① | ② | ③ | ④ |
| 13. I am jittery .....                                     | ① | ② | ③ | ④ |
| 14. I feel indecisive .....                                | ① | ② | ③ | ④ |
| 15. I am relaxed .....                                     | ① | ② | ③ | ④ |
| 16. I feel content .....                                   | ① | ② | ③ | ④ |
| 17. I am worried .....                                     | ① | ② | ③ | ④ |
| 18. I feel confused .....                                  | ① | ② | ③ | ④ |
| 19. I feel steady .....                                    | ① | ② | ③ | ④ |
| 20. I feel pleasant .....                                  | ① | ② | ③ | ④ |

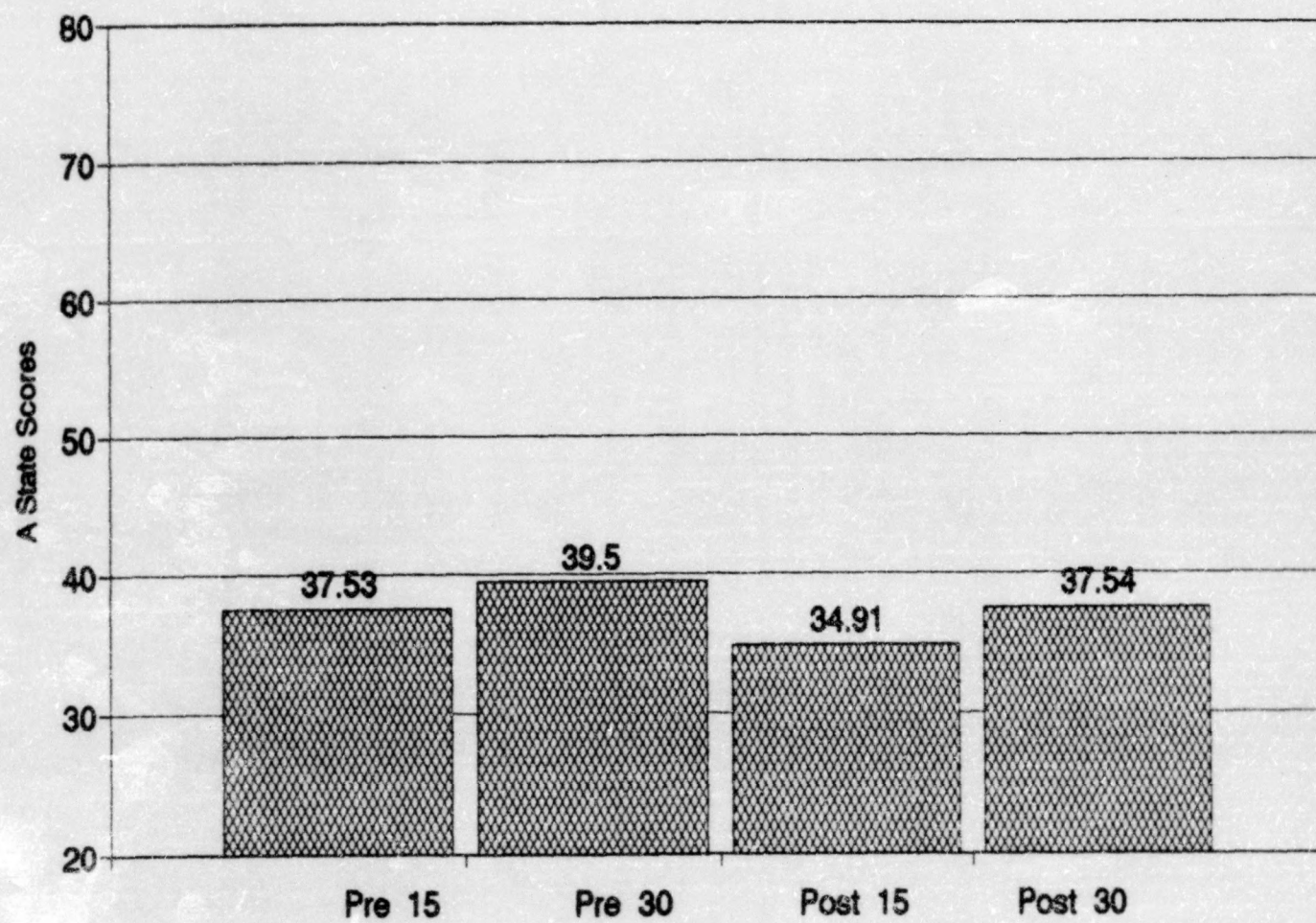


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APPENDIX B

Participants Mean Scores





PARLIAMENT DEBATE

SOUTH-WESTERN

1882-1883

APPENDIX C

PROCEDURES FOR SCORING STAI  
Form Y-1  
for State Anxiety

1. For each item one of four responses are possible:  
(Not at all, Somewhat, Moderately so, Very much so)
2. All 20 items are scored
3. Items 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 are reversed in their 1 through 4 point value making Not at all=4, Somewhat=3, Moderately so=2, Very much so=1
4. Items 3, 4, 6, 7, 9, 12, 13, 14, 17, and 18 are kept in a 1 through 4 point value with a pattern of Not at all=1, Somewhat=2, Moderately so=3, Very much so =4
5. All points are added up with a minimum score possible of 20 and a maximum score of 80



## APPENDIX D

## SELF-REPORT QUESTIONNAIRE

Read each statement and then circle the appropriate answer.

1. On a scale of 1 to 10 (1=lowest, 10=highest) rate how physically active you believe yourself to be

1   2   3   4   5   6   7   8   9   10

2. How many days per week do you work-out on an average?

1   2   3   4   5   6   7

3. How long have you been physically active?

1. Beginning with class
2. 6 weeks
3. 1 year
4. 2 years
5. Longer



APPENDIX E

## **INFORMED CONSENT**

**I have been requested by Toni DeVolder, a graduate student at Western Kentucky University, to be in her research study. I have been informed that this study will aid in determining outcomes of physical activity.**

**My participation will involve completing evaluation tests before and after my program of aerobic dance. I understand I will be required to monitor my heart rate during the workout. I am also aware there are foreseeable risks involved in any physical exercise.**

**I have read the above information. I understand I may withdraw my participation at any time without penalty. In signing this consent form, I am not waiving my legal rights. A copy of this form will be given to me at my request.**

**Signature\_\_\_\_\_date\_\_\_\_\_**



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APPENDIX F

TARGET HEART RATE  
FORMULA

Maximum Heart Rate Chart

(According to Age)

Under 31      (195)

31 - 41      (185)

41 - 51      (175)

Maximum Heart Rate for Age: \_\_\_\_\_

Subtract Your Resting Heart Rate : \_\_\_\_\_

Answer: \_\_\_\_\_

Multiply by 75%: \_\_\_\_\_

Add Your Resting Heart Rate: \_\_\_\_\_

YOUR TARGET HEART RATE IS: \_\_\_\_\_

Memorize this number: this is the heart rate you should be at  
during exercise to maximally benefit your heart.



APPENDIX G

## VIDEO INFORMATION

Frederick, Cathe. (1987). Step N Motion

Description: Warm ups and stretches in the begining. Aerobic portion starts with the step\*. The video includes repetition and sequencing. The longer the aerobic portion, the more of a workout you receive. There are timed 8 minute segments in which you calculate you heart rate during the exercise. The video ends with a cooldown.

\* refers to an aerobic dance specific platform in which you step up on throughout the workout. It is approximately 3 feet wide and the height depends on how many segments the individuals place under it.



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